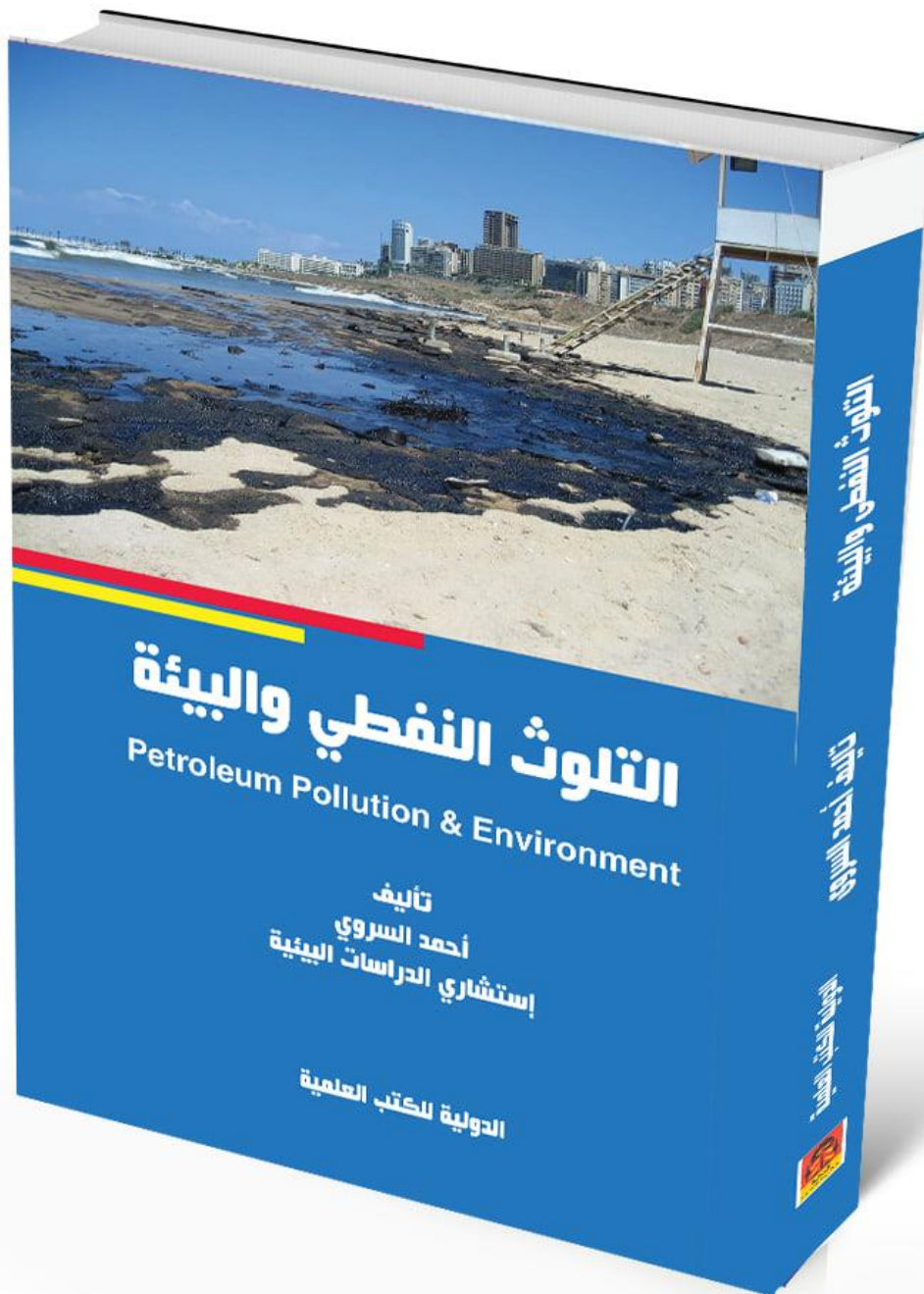




مقدمة عن الانسكاب النفطي

أحمد السروي
استشاري الدراسات البيئية ومعالجة المياه



التلوث النفطي والبيئة

Petroleum Pollution & Environment

تأليف

أحمد السروي

إستشاري الدراسات البيئية

الدولية للكتب العلمية

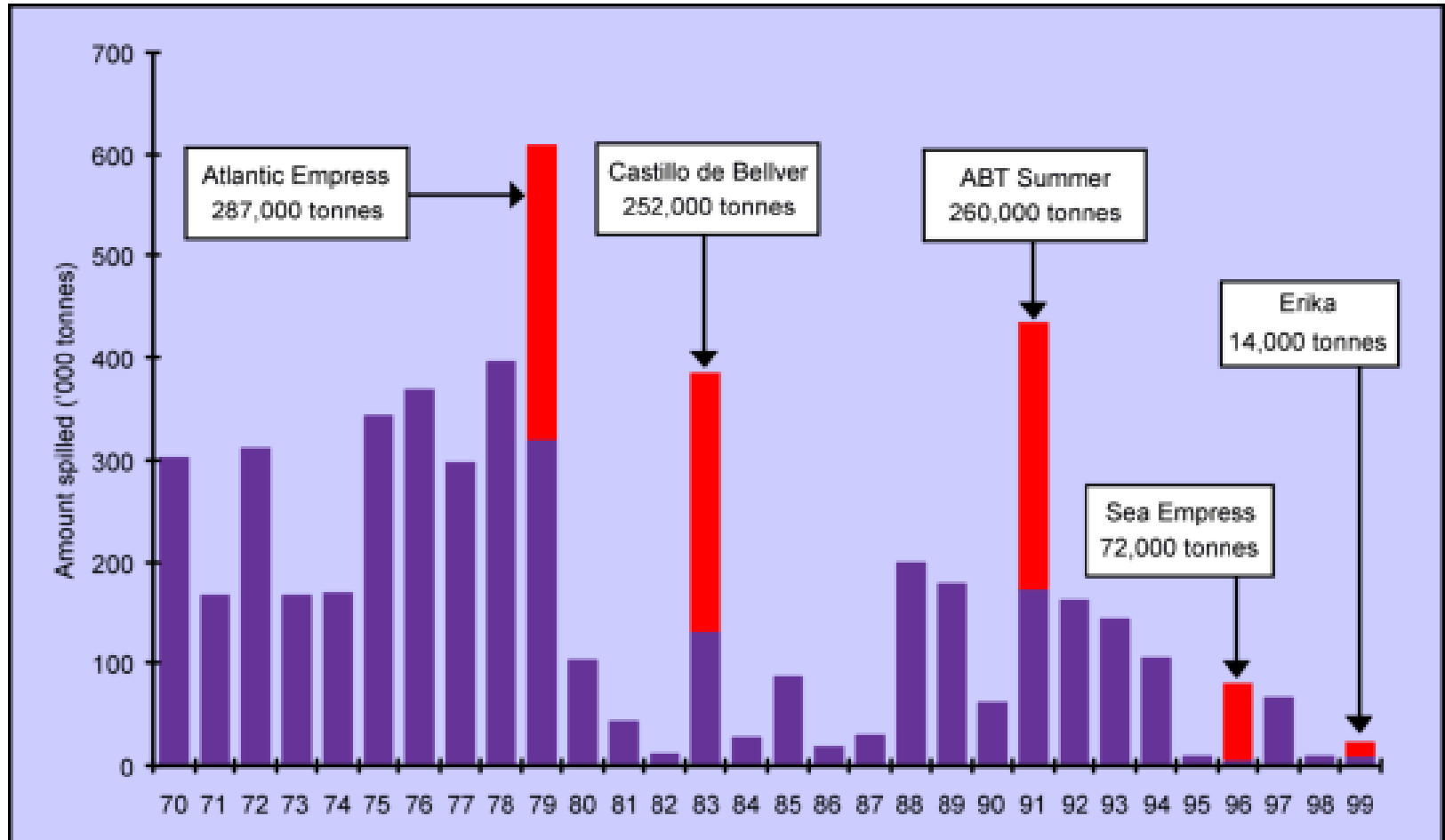
التلوث النفطي والبيئة

تأليف أحمد السروي

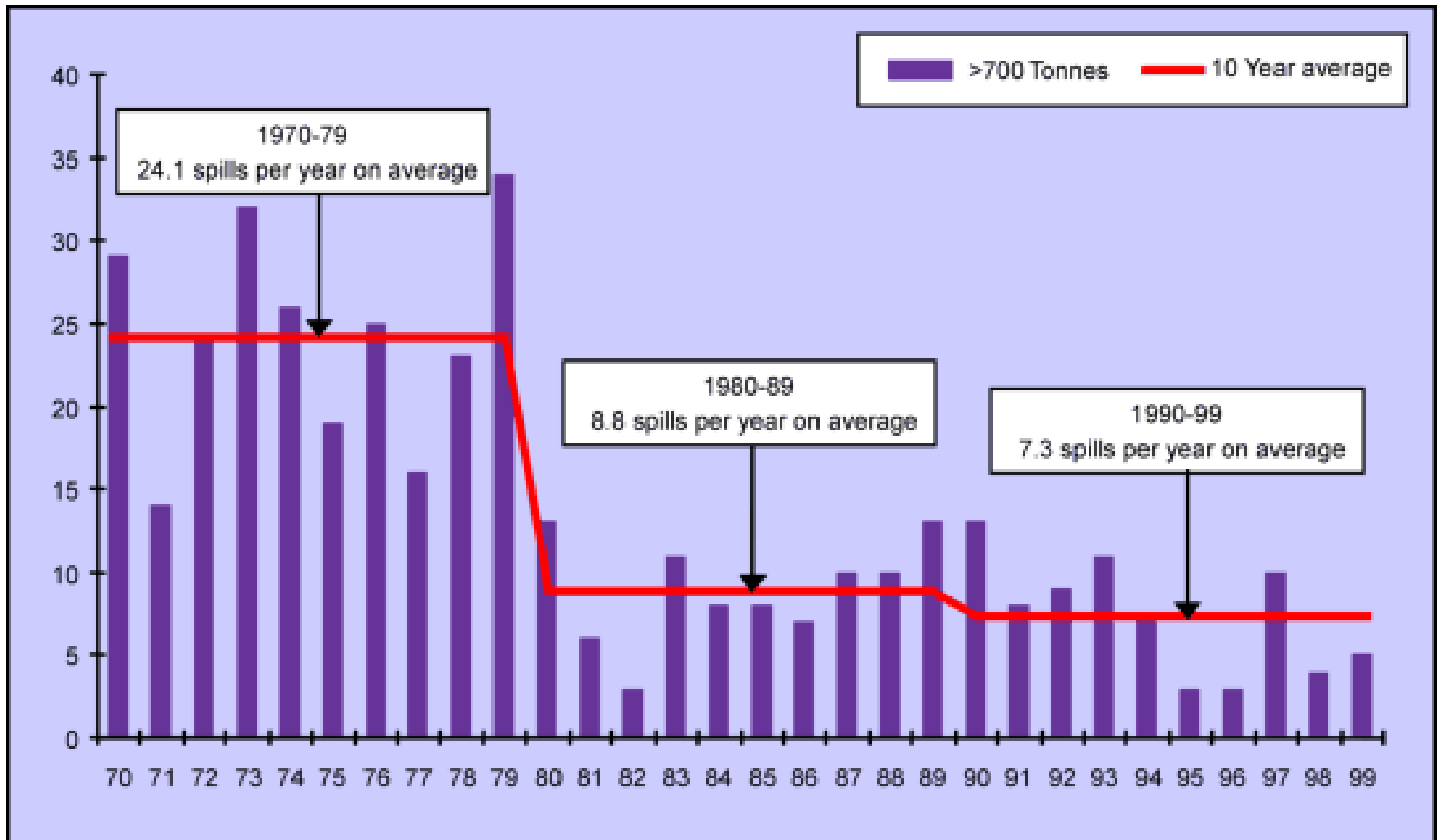
الدولية للكتب العلمية



Quantities of Oil Spilled 1970 - 1999



Spill Trend - 1970 to 1999



Oil Barge & Tanker Routes

Exxon Valdez

Nestucca



The Great Circle Route - Major Vessels

Kuroshima

Tenyo Maru

New Carissa



Relative Spill Risk - British Columbia

Risk = Function of Probability & Consequences

*Low Probability, High
Consequences*

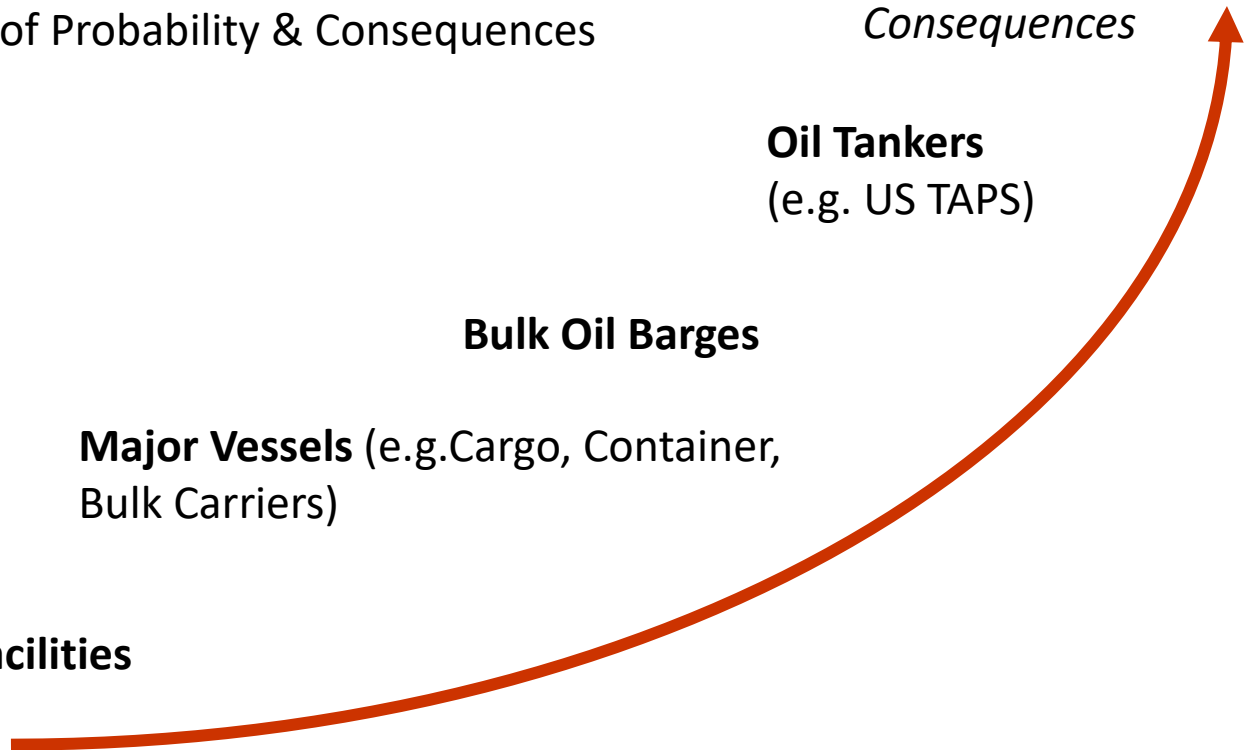
Oil Tankers
(e.g. US TAPS)

Bulk Oil Barges

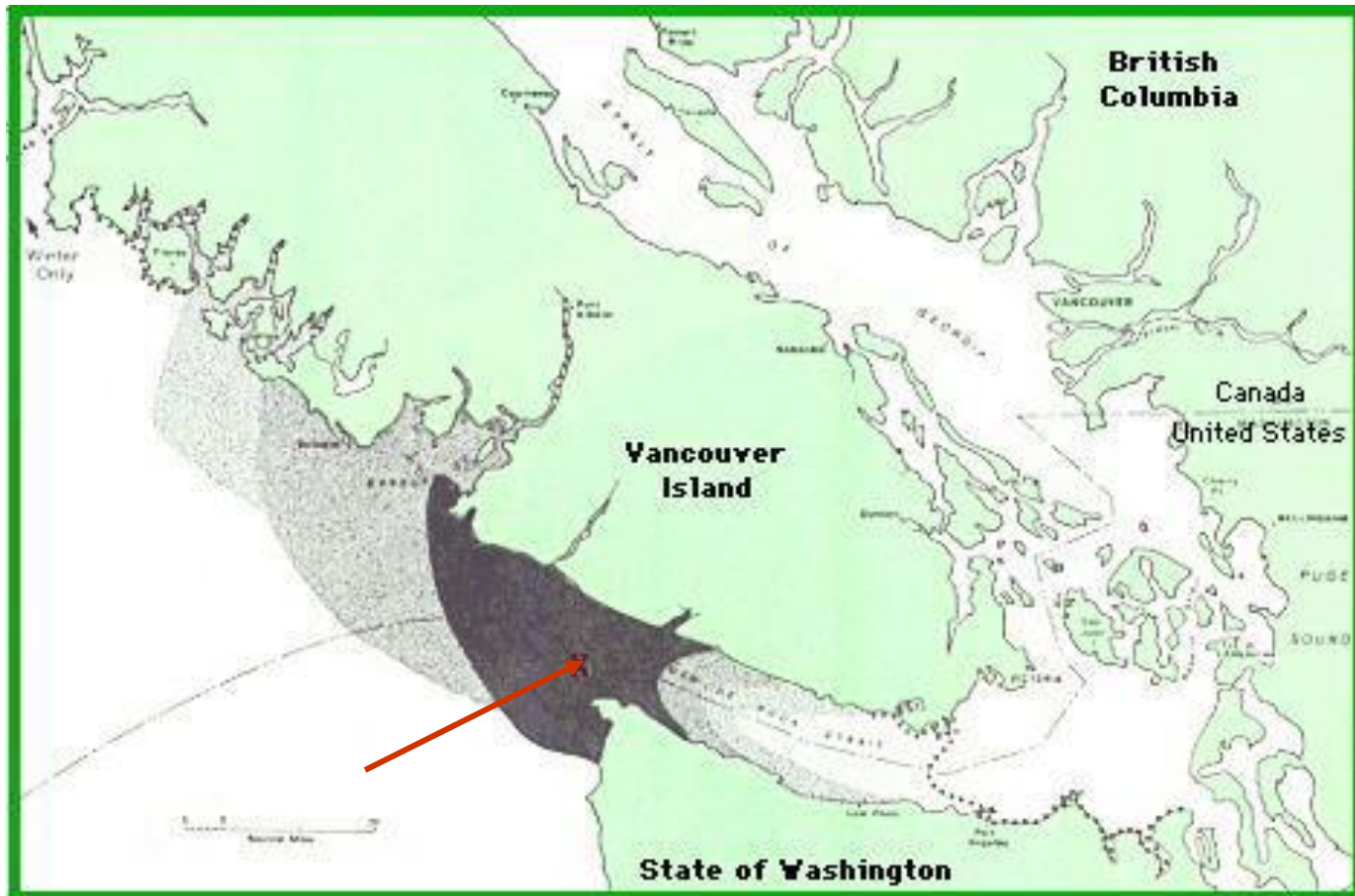
Major Vessels (e.g. Cargo, Container,
Bulk Carriers)

Fuel Handling Facilities

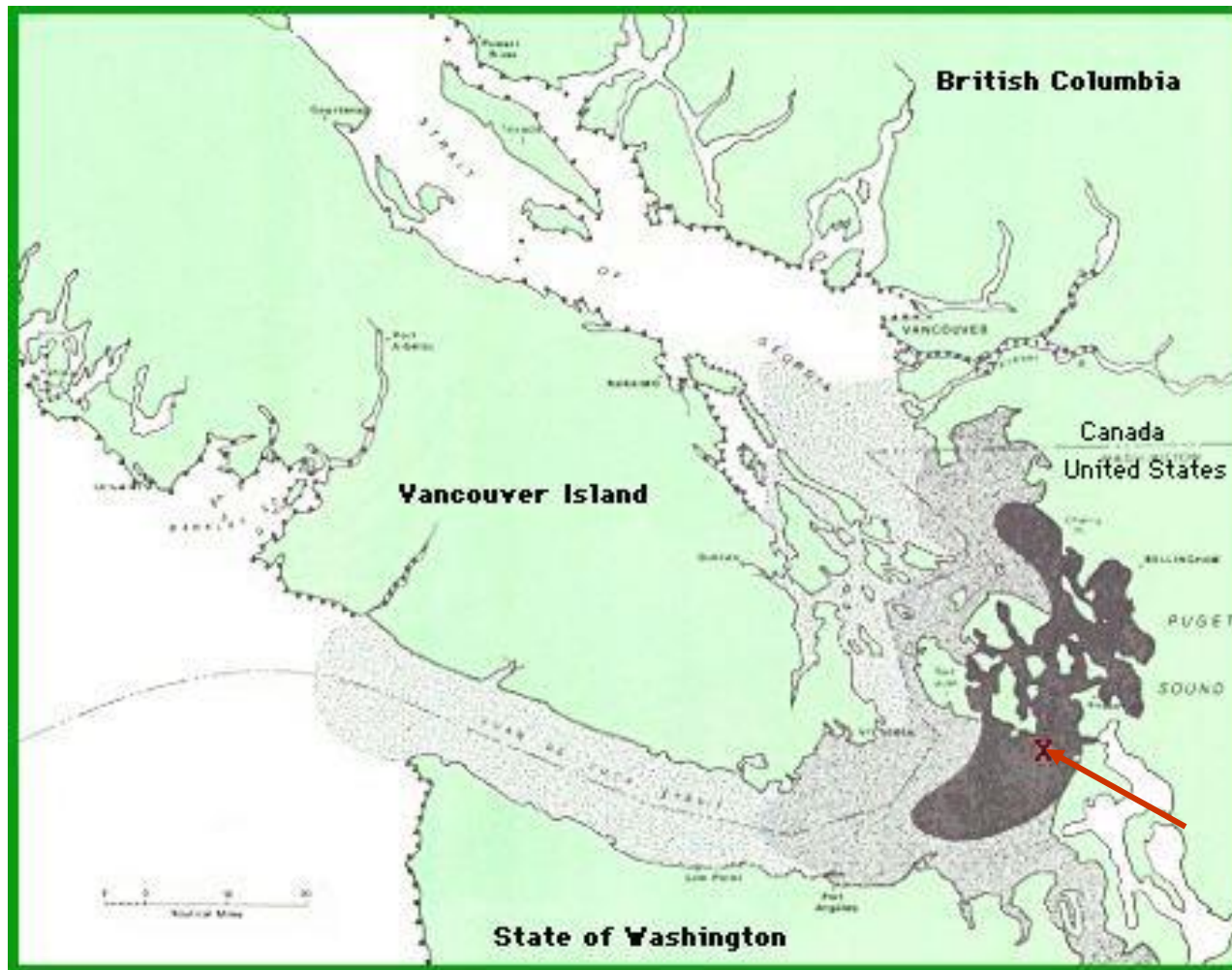
*High Probability, Low
Consequences*



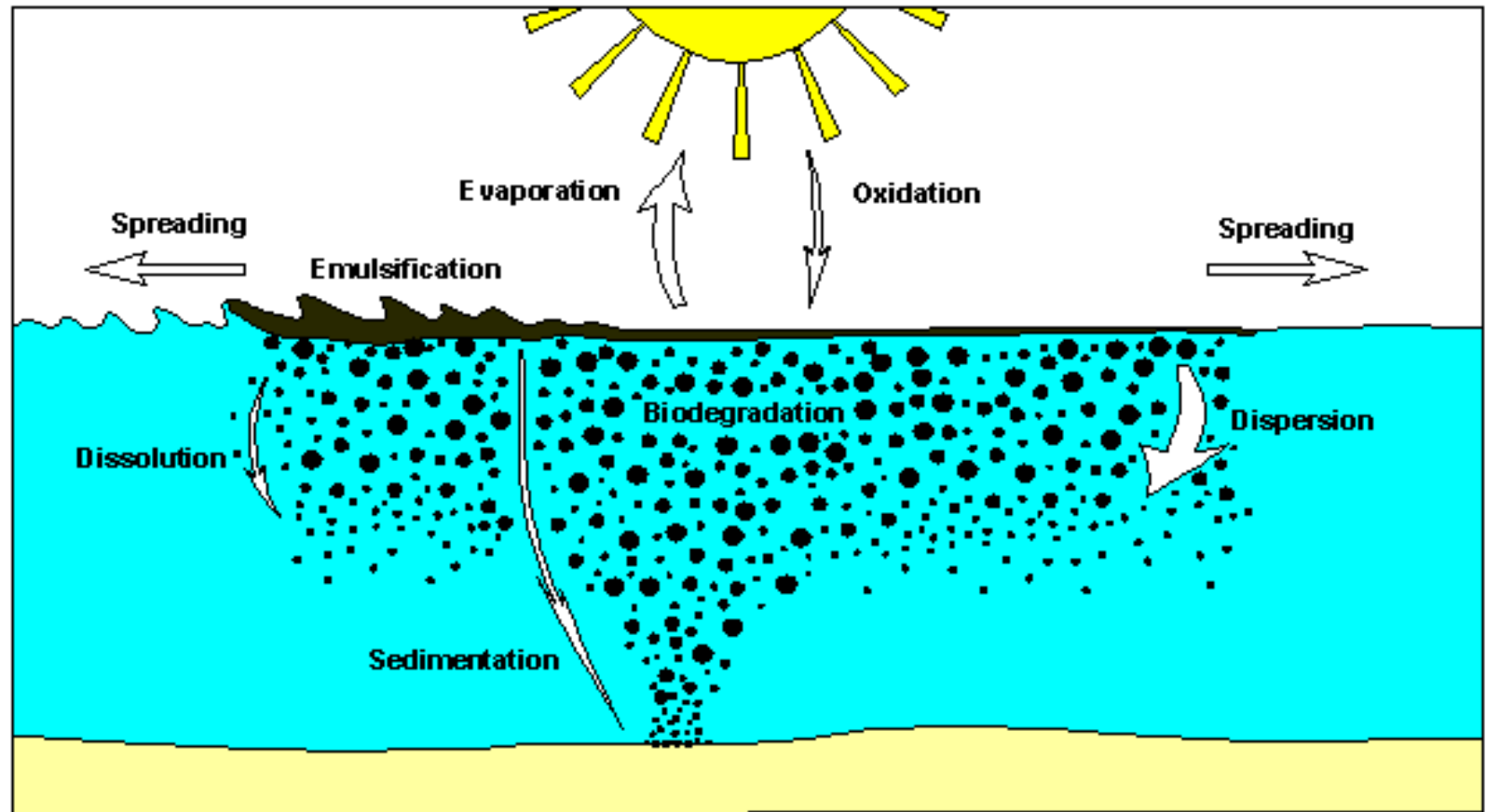
Spill Scenario 1 - Outer Juan de Fuca Strait



Spill Scenario 2 - Rosario Strait



Fate and Effect of Spilled Oil



Impacts of a Major Oil Spill



- **Destroys Marine Life**
- **Destabilizes Marine Communities**
- **Degrades Shore Amenities**
- **Harms Economic Activities**
- **Impacts Human Welfare**

Destroys Marine Life

Physical contamination and smothering are primary mechanisms that adversely affecting marine life - particularly inter-tidal organisms. Oil can also change the physical characteristics of a habitat.

Clean-up activities can add to these effects by crushing, removing, and damaging marine life.

Birds and mammals suffer the greatest acute impact when they meet the oil/water interface and become contaminated. Reduction in thermal capability, and directed toxicity from fumes and ingestion are the greatest causes of mortality.

Destabilizes Marine Communities and Populations

Marine communities, such as planktonic waters, wetlands (estuaries/marshes), kelp-beds and mud-flats, and **marine populations** such as seabirds, seals sea otters, and whales have variable resiliency to oil spills - from highly tolerant (plankton, kelp beds) to very intolerant (estuaries and sea otters).

Impacts to communities and populations are very difficult to measure due to lack of scientific methods to measure, long-term, sub-lethal, and chronic ecological impacts

Degrades Shore Amenities

Contamination of coastal amenity areas is a common feature with many marine oil spills, leading to public disquiet and concern regarding impacts to boating, sun-bathing, swimming, angling and other recreational pursuits.

The prevailing question is how much and how long of an impact? The degree of impact to recreation is largely based on the season it occurred.. Summer being the highest impact period due to recreation and tourism.

Harms Economic Activities

Economic activities that can be adversely affected by an oil spill include: tourism, hotel and restaurant businesses, dive and fishing charters, rentals, marina operations. There can also be direct impacts to commercial fishing and aquaculture due to closures or concerns about tainted products.

The impacts to a coastal communities economic activities can be accentuated by media press, beyond the actual impacts to the recreational and commercial opportunities.

Impacts Human Welfare

A spill's impact to human welfare is often under-rated. Coastal communities, and public in general, are deeply passionate about a safe, clean marine environment. There is no tolerance for accidental spills of oil of any quantity. As such a marine oil spill accentuates this passion, often beyond rationale thinking.

During an incident, public stress and anxiety prevail over the long-term economic uncertainty of lost welfare. In addition, a large influx of spill money can divide a communities from those the volunteer from their "hearts" and those the offer their services for a "fee".

Spill Impact Recovery



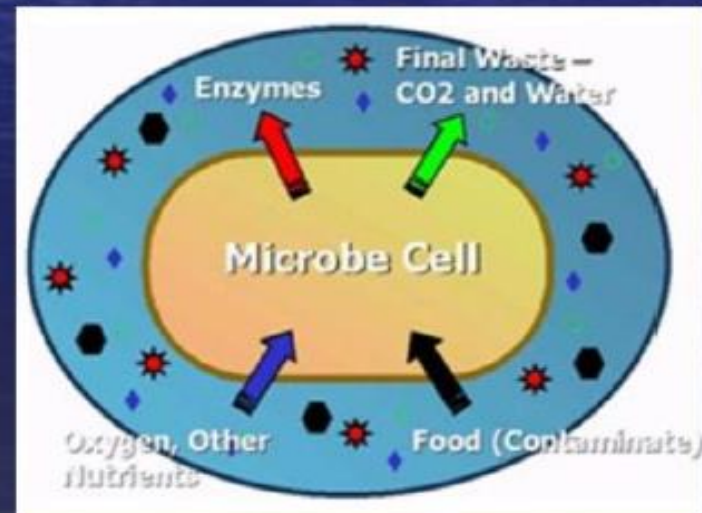
The recovery of the marine environment from the effects of a spill is generally thought to be **“a return to the precise conditions that preceded the oil spill”**. However, this is very unlikely to happen. As such, the measurement of spill recovery **is based on a comparison of unoiled sites with oiled sites of similar ecological characteristics**.

Waves of Oil



So how do we clean it up?

- Containment and Removal
- Application of Dispersants
- Bioremediation
 1. Enzymes released by the microbe break the contaminant down into digestible pieces.
 2. The contaminant is consumed as food by the cell.
 3. Harmless biological wastes are all that remain of the contaminant.



Methods Of Cleaning

- High or low pressure hoses to spray oil off beaches
- Sorbents
 - Large sponges that collect oil
- Booms
 - Collects oil off the water
- Controlled Burning
 - Reduces amount of oil
- Skimmers
 - Boats that removes the oil

Booms



Controlled Burning

Clean-up Methods

1. **Dispersants:** act like soap to break up large oil slicks into smaller more manageable particles.
2. **Booms:** long floating tubes that are put on the water surface to contain an oil spill (usually to protect the shoreline.)
3. **Skimming:** specially designed boats “scrape” the oil off of the surface.
4. **Absorbants:** materials that can help “suck-up” the oil to make it easier to recover.

Dispersants

- Dispersants are chemical solvents or **surfactants**.
- **They don't eliminate oil**, they make it less obvious by breaking it into small pieces which spread throughout the ocean.
- The dispersant **Corexit** is being used by BP and has been proven to be toxic to microorganisms and fish eggs.

Dispersants

GOOD

- Acts like soap to break up oil into smaller clumps

BAD

- Adds more chemicals to the ocean

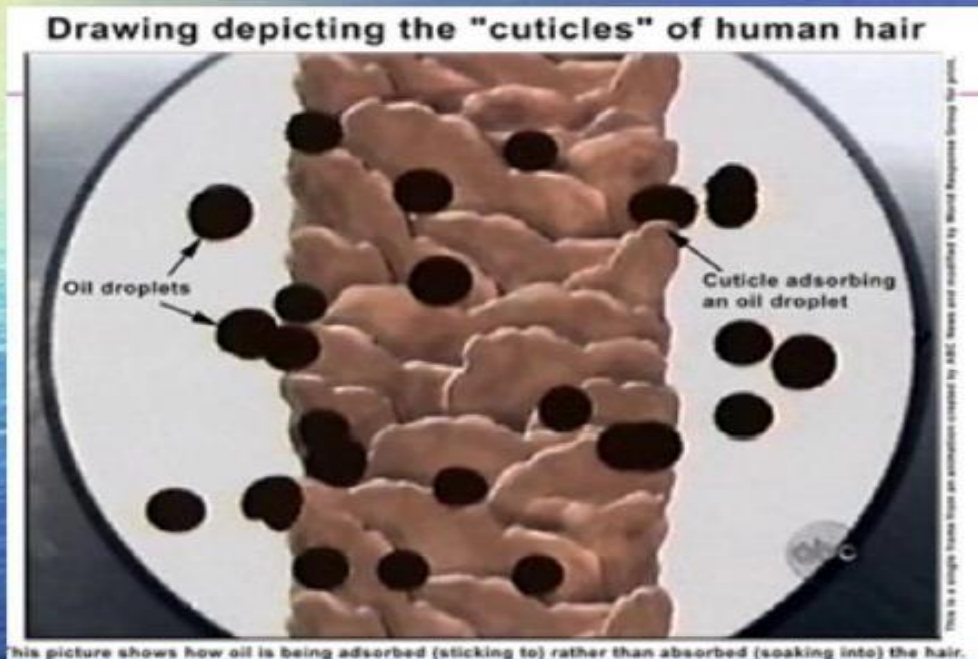


Booms

Help contain the oil slicks on the ocean surface



Human Hair & Sheep's Wool



- Wool adsorbs oil meaning the oil sticks to the hair but does not soak into it.
- There are over 370,000 hair salons in the US and each cut about one pound of hair a day.

Recycled Cellulose Material

- Made of recycled natural plant material.
- It begins to absorb the moment it touches oil.
- This material is hydrophobic so it repels water while absorbing only oil.

Oil Absorbing Polymer

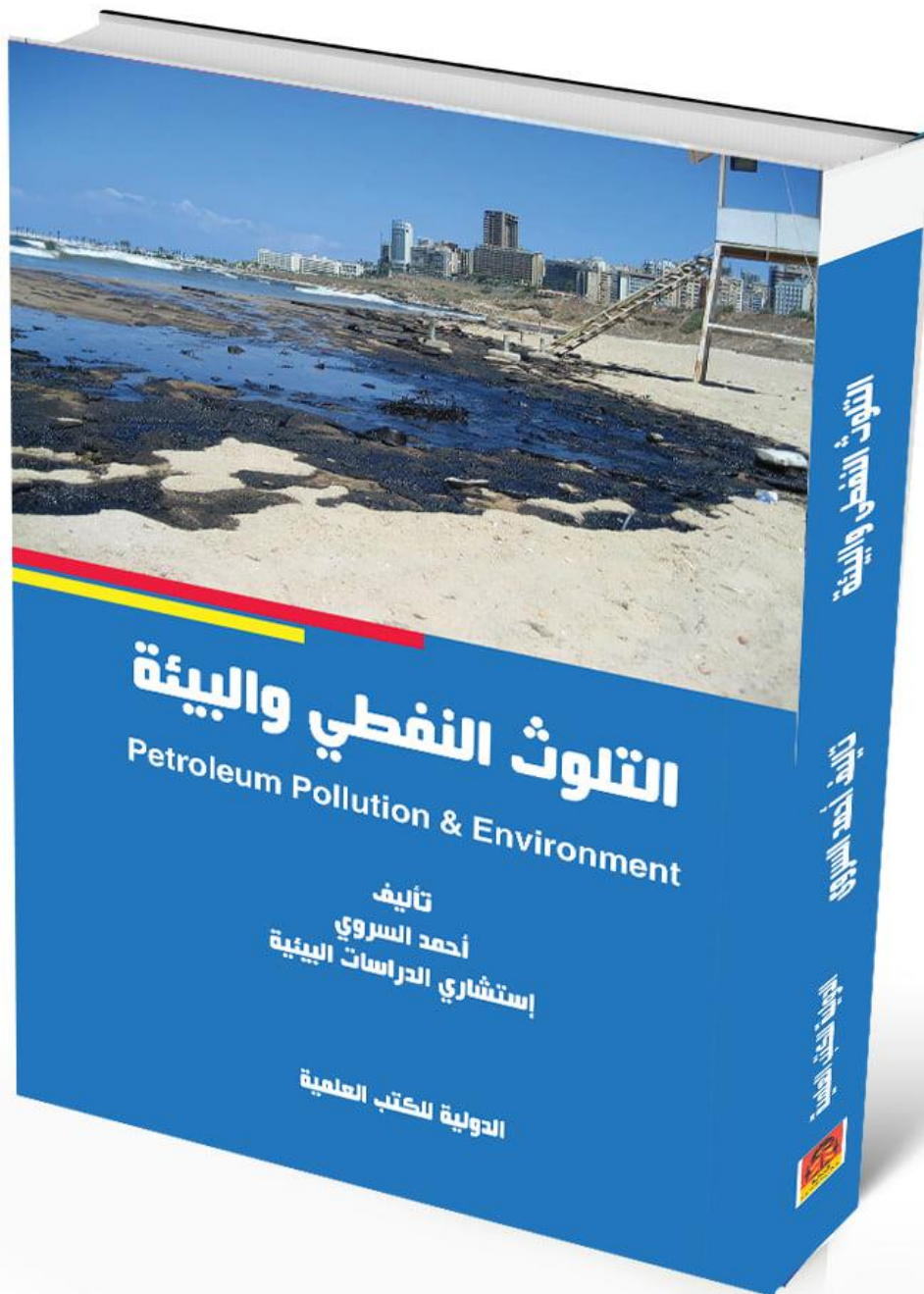
- **Envirobond 403** is a polymer specifically formulated to bond to crude oil.
- **Polymers** are made up of many many molecules all strung together to form really long chains
- When the polymer comes in contact with a liquid hydrocarbon (oil) the free hydrocarbons bond to the polymer and form a gel.
- The **hydrophobic** properties of the polymer prevent it from absorbing water.

Ways of Preventing Oil Spills

- Navigation
 - Coast Guard must know where the tankers can drive
- Inspect equipment more
- Double Hulling
 - 2 layers of watertight hull surface
 - Prevent/reduces oil spills
- Careful as possible when transporting



Double Hull





نبذة عن المحاضر

أحمد أحمد السروي

استشاري معالجة المياه والدراسات البيئية

- الدرجات العلمية
- بكالوريوس العلوم من كلية العلوم جامعة عين شمس عام ١٩٩٣ تخصص الكيمياء.
- دبلوم الدراسات العليا في الكيمياء التحليلية من جامعة عين شمس عام ١٩٩٩م
- ماجستير جودة معامل مياه الصرف والمعامل البيئية من الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري عام ٢٠٠٨ .
- ماجستير الدراسات البيئية من معهد الدراسات البيئية بجامعة عين شمس عام ٢٠١٤ .

مجال الخبرة

- ☐ استشاري متخصص في مجال معالجة المياه والدراسات البيئية ويشمل التخصص تقديم الاستشارات والتدريب وانشاء أنظمة الجودة واعداد وتاليف الكتب العلمية والبرامج والملفات التدريبية الخاصة بالمجالات الآتية :
- ☐ الدراسات البيئية (تلوث الماء -تلوث الهواء).
- ☐ معالجة المياه .
- ☐ معالجة مياه الصرف الصحي والصرف الصناعي.
- ☐ دراسات تقييم الاثر البيئي للمشاريع الصناعية.
- ☐ نشر اكثر من خمسة وثمانون كتابا علميا متخصصا في مجال معالجة المياه ومجال العلوم البيئية
- ☐ اعداد العديد من الملفات العلمية والادلة الارشادية في مجال معالجة المياه ومجال العلوم البيئية لصالح العديد من المكاتب الاستشارية داخل وخارج مصر.

بيانات الاتصال

- aelserwy71@yahoo.com
- aelserwt71@gmail.com
- موبيل / ٠٠٩٦٦٥٦٤٧٠١٣٩١ - المملكة العربية السعودية

**THANK
YOU**